

REMARKS

Claims 1-17 and 33-36 are pending in this application. Claim 37 is added to the application by the amendment. Applicants submit that support for new claim 37 may be found at least at paragraphs [0026] and [0029]. Applicants submit that all of the claims are in condition for allowance, and respectfully request reconsideration and allowance of all pending claims.

An Information Disclosure Statement (IDS) for the pending application was filed July 24, 2009. As provided for under 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement. The new references provided in the IDS report the work of several scientific organizations, universities, and companies that are now actively pursuing technologies for modulating a system in response to changes in water surface and/or weather. This RCE is being filed so that those references can be considered by the Examiner. Applicants respectfully request that the new references be favorably considered during the continued examination of this application.

Claim Rejections under 35 U.S.C. § 101

The USPTO has recently promulgated August 2009 “Interim Examination Instructions for Evaluating Subject Matter Eligibility Under 35 U.S.C. § 101.” These instructions state that there are two separate patentability considerations to be considered: (1) subject matter and (2) utility.

The most recent statement of the reasons for the 35 U.S.C. § 101 rejection can be found in the Examiner’s Answer of January 9, 2009 at pages 3-4. There does not appear to be any dispute that the claims meet the subject matter criteria, i.e., that they are directed to a process tied to a particular machine or apparatus or transform a particular article into a different state or thing. Rather, the issue raised is directed to whether the claims have credible “utility.” For example, the Examiner’s Answer of January 9, 2009 at pages 3-4 asserts that the disclosed invention is allegedly “inoperative and therefore lacking credible utility.” What has been disclosed is a concept more in the realm of speculation and conjecture rather than the reduction of an idea to a practical application based on science and technology.” The Answer takes the position that the disclosure is not sufficient to permit one “to believe the asserted utility,” and

that “taking into consideration the enormous size of a hurricane, the process of modifying a hurricane disclosed by applicant would take more than the resources realistically available to mankind.”

The August 2009 Guidelines provide that utility is to be determined by looking to MPEP § 2107. To properly reject a claimed invention under 35 U.S.C. § 101, the Office must (A) make a *prima facie* showing that the claimed invention lacks credible utility and (B) provide sufficient evidentiary basis for factual assumptions relied upon in establishing the *prima facie* showing... using documentary evidence, e.g., scientific journals, excerpts from books, or patents, when available, to support the factual basis for the *prima facie* showing of no credible utility. In the absence of documentary evidence, the Office should explain the scientific basis for the factual conclusion. MPEP §2107.02(IV). According to MPEP § 2107.02(IV), “[i]f the record as a whole would make it more likely than not that the asserted utility of the claimed invention would be considered credible by a person of ordinary skill in the art, the Office cannot maintain the rejection.” Applicants respectfully submit that given the evidence of record, including the new references provided, a person of ordinary skill in the art is “more likely than not” to consider the asserted utility of the claimed invention credible.

The basic premise of the 35 U.S.C. § 101 rejection appears to be that hurricanes are simply too big to be reduced in intensity. Consistently applied to all applications in the USPTO, would seem to preclude the issuance of *any* claims in *any* application directed to mitigating hurricane intensity, on the basis that such claims, by their very nature, lack credible utility.

However, the evidence submitted with the July 24, 2009 IDS directly contradict this basic premise. Multiple independent and respected scientific sources have asserted that hurricane mitigation possible.

For example, Searete LLC, a venture involving Bill Gates, has filed five U.S. Patent applications directed to hurricane mitigation. These are the “Bowers” applications listed on the IDS filed July 24, 2009. The references disclosed in these applications reveal a number of scientific sources asserting that hurricane mitigation is credible.

Atmocean, Inc.TM has developed a wave-driven ocean upwelling system. The system is located in the open ocean, i.e., hundreds of miles from land, and functions to pump deep ocean water to the ocean surface thereby cooling the upper ocean (Cite No. BF-BL). The upwelling system may be used to downsize hurricanes. Specifically, mathematical modeling outlining the placement of the upwelling arrays at a certain depth and location shows the lowering of the upper ocean temperature by a few degrees C, thereby reducing winds by up to 15% and reducing the overall damages by up to 40%.

The EC Wave Dragon Project (“Wave Dragon”) is another example of an open ocean, wave converting system that can be modulated in response to changes in the ocean surface and/or weather. The Wave Dragon is an on-going collaboration between over 10 international research groups (pages 1 and 2, Cite No. BC).

The Dyn-O-Mat Company has developed and patented (U.S. 6,315,213) an absorbent polymer product, known as Dyn-O-Gel, which has been shown to downsize storms and has the potential of reducing a hurricane. In two separate experiments, introduction of the product into a storm cloud has been shown to dissipate the cloud. In one case, the complete disappearance of a building thunderstorm was documented by Doppler radar (page 1, Cite No. BE).

Several research articles specifically directed to methods for reducing hurricane intensity have been published in peer-reviewed journals provide clear scientific support for the credible utility and operation of the claimed invention. For example, Rosenfield et al. provides evidence that particular methods that cool the environment surrounding a hurricane, i.e., seeding-induced evaporative cooling, can reduce the overall strength of a hurricane. [page 3421, Cite No. BN] Additionally, LaRosa describes suppression of hurricane intensity and even the possibility of preventing hurricanes by reducing sea surface temperature. The publication states:

“The author believes that sea surface cooling merits consideration by the oceanographic, marine, environmental, maritime, offshore, and many other sciences and industries, as well as politicians, the public, insurance companies, financial institutions, and others This paper has concentrated on the technical

feasibility of providing enough sea-surface cooling to actually improve the hurricane statistics.” (page 5, Cite No. BM).

Finally, Applicants submit that by recently allowing several patents directed to methods of altering weather, e.g., U.S. Patent No. 6,315,213 (Dyn-O-Gel) and U.S. Patent No. 7,520,237, the USPTO has acknowledged the utility of the claimed invention to mitigate a hurricane. Applicants respectfully submit that in view of the documents published by independent scientific groups *and* the patents allowed by the USPTO itself, the Office cannot maintain a rejection based on a lack of credible utility.

In fact, U.S. Patent No. 7,520,237 provides a method for using cold water upwelling to mitigate a hurricane. Specifically, claim 1 recites:

A hurricane prevention system for use in water of the ocean, comprising: a buoyant platform; a wind-driven power source disposed on the buoyant platform; a water-moving system connected to the buoyant platform and powered by the wind-driven power source configured to transport the water from deeper in the ocean toward the surface of the ocean; a water-dispersing system connected to the buoyant platform and configured to disperse the water from deeper in the ocean; a mooring system configured to secure the buoyant platform in a generally stable position in relation to an ocean floor; and a temperature sensor system disposed on the buoyant platform configured to control the activation and deactivation of the hurricane prevention system.

The issued patent provides no more disclosure than is provided in the pending application, yet the Office clearly found the claims of the now issued patent have credible utility.

35 U.S.C. § 101 requires a threshold test - does the claimed subject matter have credible utility ? If it does, the test is passed. Applicants appreciate that the USPTO is also disputing whether Applicants have enabled the claims. However, that is an issue to be considered under 35 U.S.C. § 112, discussed below. Accordingly, for all of the above reasons, Applicants respectfully request withdrawal of the rejection to the pending claims under 35 U.S.C. § 101.

Claim Rejections under 35 U.S.C. § 112, First Paragraph

The standard for determining whether the specification meets the enablement requirement may be determined by asking whether an undue or unreasonable amount of experimentation is required make and/or use the claimed invention.

The most recent statement of the reasons for the 35 U.S.C. § 112 rejection can be found in the Examiner's Answer of January 9, 2009 at pages 4-5.

First, the Answer at page 4 asserts that "since the asserted utility is not credible for the reason set forth above, one skilled in the art would not know how to make and use the claimed invention. Applicants respectfully submit that the determination of whether there is patentable subject matter under 35 U.S.C. § 101 is a determination separate from whether there is enablement under 35 U.S.C. § 112, and that the standard for enablement should be applied to determine whether there is enablement. That standard is set forth in the Examiner's Answer at page 5: "the standard for enablement is whether a person skilled in the art would have sufficient information from the application disclosure to make and use the claimed invention without undue experimentation. In this case, the amount of experimentation necessary to perform the process disclosed would be undue." To support the allegation of undue experimentation, the Office lists several of the factors listed in MPEP § 2164.01(a).

The Office may make an initial enablement rejection by providing a "reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure." MPEP § 2164.04. However, the ultimate determination must be made by *weighing all of the evidence*, including evidence subsequently submitted by the Applicant. The determination should never be made based on personal opinion. MPEP § 2164.05.

Applicants respectfully assert that evidence previously provided, including three declarations from experts, and as discussed in the Appeal Brief at pages 22-32 and in the Reply Brief at pages 11-13, establish enablement. Applicants are not restating those arguments here, but respectfully request that they be treated as incorporated herein. This RCE is being submitted to allow the Examiner to additionally consider the new references filed in an IDS on July 24, 2009.

Breadth of the Claims

The Office alleges that the claimed invention is “broad and sweeping in scope.” When evaluating the scope of the claims, “the only relevant concern should be whether the scope of enablement provided to one skilled in the art by the disclosure is commensurate with the scope of protection sought by the claims.” MPEP § 2164.08. The rejection does not appear to be directed at the breadth of the specific elements of the claim, such as positioning submersibles or releasing gas, but rather appears to be an assertion that following the specific elements of the claim will not “reduce the intensity of a hurricane.” See Answer at 6. Applicants respectfully assert that the evidence submitted with the July 24, 2009 IDS shows that many people in the scientific community believe that it is possible to reduce the intensity of a hurricane by cooling the ocean surface, and that such cooling may be achieved by upwelling cold water, steps that are described in the patent application, and enabled as asserted in the Appeal Brief at 22-32.

Applicants also respectfully assert that this element is misapplied in the Examiner’s Answer. For example, if Applicants were trying to claim all methods of reducing hurricane intensity, weather control, such as seeding clouds with the absorbent polymer product Dyn-O-Gel described in U.S. 6,315,213, it might be reasonable to argue that Applicants had overstepped the scope of protection enabled by the specification’s description of cooling ocean surface temperature by upwelling cold water. However, Applicants claims are reasonably tailored to the scope of the disclosure.

Nature of the Invention

The Office alleges that the claimed invention is not enabled, because the claims are directed to “a large scale environment change.” The Office appears to consider the scale of the invention as a factor in determining the invention is not enabled. The scale of implementation needed is not the legal standard of enablement and, therefore, does not establish undue experimentation.

While the claims may be seen as related to a large scale change, the issue at hand is the support provided for those claims. Applicants submit that there is adequate support for one of ordinary skill to determine what to use and how to use it in order to implement the claimed invention. As noted previously, the Office has allowed several patents directed to large scale environmental changes. In particular, U.S. Patent No. 6,315,213 related to storm prevention and

U.S. Patent No. 7,520,237 related to hurricane prevention have recently been passed to issue by the USPTO. The U.S. Patent No. 7,520,237 in particular is directed to a method for mitigating hurricanes by using cold water upwelling to cool the surface of the ocean, and provides no more disclosure than is provided in the pending application. Therefore, an enablement rejection based on the large scale nature of the claimed invention is not warranted.

The Level of One of Ordinary Skill in the Art

The Office alleges that the level of ordinary skill in the art is best characterized as that of “a theoretical scientist dealing in probabilities rather than that of an engineer dealing in practical applications of technology.” Applicants respectfully disagree with this statement, as asserted in the Reply Brief at Pages 12-13. For example, one seeking to modify an existing submersible to release gas would look to an engineer with experience in submersibles, not to a theoretical scientist.

In addition, the new references also show that a number of independent scientific groups have developed methods to mitigate weather, even hurricanes, and have demonstrated the successful practical application of these methods beyond computer models. Dyn-O-Gel has been shown in multiple experiments to dissipate a storm cloud and, as mentioned above, the product was awarded a patent. Moreover, several patent applications submitted by a team working with Bill Gates disclose methods to weaken a hurricane by bringing cooler water to the ocean surface. A front page article in the Roanoke Times describes the strategies provided in Gates applications and the pending application (Roanoke Times, Saturday August 22, 2009). The article also further emphasizes the interest in these methods and the importance of the problem these methods address. The new references provide further evidence that the level of skill in the art is high, and that the PTO has recognized the practical application of methods in the field.

The Level of Predictability in the Art

The Office alleges that the “outcome of the disclosed concept is entirely unpredictable.” Applicants respectfully disagree. Predictability in the Art is discussed in the MPEP § 2164.03. The most common context for this factor appears to be the chemical arts, where, if one species of chemical is shown to work, it is unpredictable whether other species may work.

The present claims are directed to “A method of making a reduced intensity hurricane...” These claims are directed to *some* level of hurricane mitigation, not a *specific amount* of reduction in intensity. The Office’s concern regarding the predictability of the claimed method might be relevant if the application was in a crowded art and the particular amount of reduction was important to limit the claimed invention or distinguish over existing art. However, this is not the case. The invention claims *some* mitigation of a hurricane. The Applicants respectfully submit that the guidance provided the specification is more than adequate for one of ordinary skill to use a submersible to upwell cold water and achieve *some* level of hurricane mitigation. Whether the calculation of the exact number of submersibles to achieve a particular amount of cooling is not exactly accurate, as argued in the Examiner’s Answer at pages 6-10, is simply not relevant, so long as there is cooling that reduces hurricane intensity.

Moreover, a growing body of scientific literature shows that a reduction in the temperature of the ocean’s surface can mitigate a hurricane. Atmocean, Inc.TM reports an appreciable decrease in the intensity of a hurricane, and thus the damages incurred from a hurricane, in response to upwelling at a given depth and location can lower the upper ocean temperature by a few degrees C. LaRosa and Rosenfeld et al. both demonstrate that by reducing the temperature of the hurricane’s environment, either the air or the water, can result in a reduction in the intensity of the hurricane. La Rosa specifically states that “[h]urricane intensification can be prevented by cooling critical areas of the sea surface,” and goes on to provide a detailed method for bringing deep ocean cold water to the surface as well as calculations for the effect on the hurricane following cold water upwelling. (page 1-2, Cite No. BM).

Collectively, the research of these scientific groups provides undeniable evidence that those of ordinary skill in the art believe hurricane mitigation is an important and practical field of study.

Moreover, as discussed above, the USPTO recently allowed several patents related to similar methods. In particular, U.S. 7,520,237 is directed to a method for mitigating hurricanes by using cold water upwelling to cool the surface of the ocean. The specification of the 7,520,237 patent provides no more disclosure to guide one of ordinary skill than is provided

in the pending application, yet the patent was allowed. Clearly, if the USPTO recognized that the disclosure of the U.S. 7,520,237 is sufficient to meet the enablement requirement for claims directed to a similar method, than surely the disclosure of the current application is sufficient to constitute enablement of the pending claims.

Existence of Working Examples

The Office alleges that the claimed invention is not enabled, because the application is “devoid of working examples.” According to the MPEP § 2164.02, working examples or an actual reduction to practice is not required if the invention is otherwise disclosed in such a manner that one skilled in the art will be able to practice it without an undue amount of experimentation. The Applicants respectfully submit that the disclosure provides more than adequate guidance for one of ordinary skill in the art to practice the invention, as evidenced by the Declarations.

The Amount of Experimentation Necessary

The Office alleges that the claimed invention is not enabled because “the amount of experimentation necessary to perform the process disclosed would be undue.” The amount of experimentation required to practice the invention, when the techniques necessary to do so are well known to those skilled in the art, is not the standard for enablement. *See, e.g., Ex parte Kubin*, 83 USPQ2d 1410 (Bd. Pat. App. & Int. 2007), *citing Johns Hopkins Univ. v. Cellpro, Inc.*, 152 F.3d 1342, 1360, 47 USPQ2d 1705, 1719 (Fed. Cir. 1998).

Undue experimentation is addressed in Applicants Appeal Brief at 25. In addition, the evidence submitted with the IDS of July 24, 2009, shows that there are several respected scientific sources that believe that cooling the surface of the ocean will reduce hurricane intensity. Applicants respectfully submit that they have enabled such cooling via their description of a way to upwell cold water. Others believe that this is reasonable, as shown in the Gates applications submitted with the July 24, 2009 IDS. Indeed, the USPTO believes that this is reasonable, as shown by the issuance of U.S. 7,520,237.

DATE OF REFERENCES

Applicants appreciate that the specification must be enabling as of the filing date, and that many of the references submitted with the July 24, 2009 IDS were published after the filing date. However, MPEP § 2164.05(b) recognizes that post-filing date references may be used, for example, to show that an invention considered impossible years after filing would also be considered impossible on the filing date. Here, the references are being submitted to show, for example, that practicing the invention would not require “more than the resources available to mankind.” Those resources did not change all that much between the filing date and the date of the references, and Applicants respectfully submit that it is appropriate to consider the references.

Moreover, Applicants’ arguments relating to the references are not directed to the actual steps of the claims, such as releasing gas from submersibles. Applicants have already provided ample evidence of the enablement of these steps, see, e.g., Appeal Brief at 18-20. Rather, the references are directed to what appears to be the Examiner’s position that hurricane mitigation is impossible, and would take “more than the resources available to mankind.” The references provide evidence showing that multiple respected scientific sources believe that hurricane mitigation is possible, to contradict the contrary position in the rejections, which are unsupported by evidence.

NEW CLAIM 37

New claim 37 is similar to existing claims, but omits any reference to hurricane mitigation or hurricanes. To the extent that the USPTO is having issues with the presence of the word “hurricane” in the claim, claim 37 should address that issue.

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Amdt. dated September 3, 2009
Reply to Office Action of July 24, 2008

PATENT

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 202-481-9900.

Respectfully submitted,


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